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*A. Zh. Kalykbayeva[1], A. A. Darmenova[2]*
*[1]PhD, Senior Lecturer, Department of Special Pedagogy, Abai Kazakh National Pedagogical University, 050010, Republic of Kazakhstan, Almaty*
*[2] First year Master's Student, Specialty 7M01908 – Special Pedagogy, Abai Kazakh National Pedagogical University,*
*Almaty, Republic of Kazakhstan, mmakhabbat@mail.ru*

## THEORETICAL ANALYSIS OF THE PROBLEM OF FORMING NONVERBAL COMMUNICATION IN CHILDREN WITH AUTISM SPECTRUM DISORDER AGED 3–5 YEARS

*Abstract*

This article provides an in-depth examination of the development of nonverbal communication in children aged 3 to 5 years with autism spectrum disorder (ASD). The study emphasizes the critical role of pointing gestures and eye contact as foundational elements in the establishment of social communication skills. These nonverbal components significantly influence emotional expression, joint attention, and cognitive development. The urgency of this topic is highlighted by the increasing number of children with ASD in Kazakhstan and the lack of adequate, evidence-based intervention programs for early childhood. A special focus is placed on the Applied Behavior Analysis (ABA) method, which has been shown to be highly effective in fostering nonverbal communication skills in children with ASD. The article outlines the importance of early intervention and the need for individualized, ABA-based programs to enhance the integration of children with ASD into educational and social settings. The findings of this research offer valuable insights for specialists in special education and inclusive pedagogy, providing practical guidance for improving the communication abilities of children with ASD.

**Keywords:** autism spectrum disorder, nonverbal communication, applied behavior analysis, preschool age, facial expressions, gestures, eye contact.

*А.Ж.Калыкбаева[1], А.А. Дарменова[2]*
*[1]PhD доктор, старший преподаватель кафедры специальной педагогики, Казахский Национальный педагогический университет имени Абая, 050010, Республика Казахстан, г. Алматы*
*[2]Магистрант 1 курса обучения специальности 7М01908 –специальная педагогика Казахского Национального педагогического университета имени Абая, Республика Казахстан, город Алматы, mmakhabbat@mail.ru*

## ТЕОРЕТИЧЕСКИЙ АНАЛИЗ ПРОБЛЕМЫ ФОРМИРОВАНИЯ НЕВЕРБАЛЬНОЙ КОММУНИКАЦИИ У ДЕТЕЙ С РАСТРОЙСТВОМ АУТИСТИЧЕСКОГО СПЕКТРА 3–5 ЛЕТ

*Аннотация*

В представленной статье рассматривается проблема развития невербальной коммуникации у дошкольников с расстройствами аутистического спектра (РАС) в возрасте от 3 до 5 лет. Центральными компонентами анализа выступают указательный жест и зрительный контакт – важнейшие элементы раннего социального взаимодействия и основа для становления последующих форм общения. Актуальность исследования обусловлена как увеличением числа детей с аутистическими нарушениями в Республике Казахстан, так и отсутствием достаточного количества адаптированных и научно обоснованных коррекционных программ, направленных

на развитие невербальных навыков. Особое внимание уделяется возможностям использования прикладного анализа поведения (ПАП) – одного из наиболее эффективных современных подходов, применяемых в практике коррекционной педагогики. Теоретическое обоснование сопровождается обзором зарубежного и отечественного научного материала, раскрывающего специфику формирования указательного жеста и зрительного контакта у детей с РАС, а также их роль в развитии эмоционального контакта, коммуникативной инициативы и социального взаимодействия. В заключение подчеркивается значимость раннего вмешательства и необходимость внедрения индивидуализированных программ, способствующих успешной интеграции детей с РАС в образовательную среду и социум. Данное исследование представляет практическую ценность для специалистов в области специальной и коррекционной педагогики, а также для педагогов, реализующих инклюзивные образовательные подходы

**Ключевые слова**: расстройство аутистического спектра, невербальная коммуникация, прикладной анализ поведения, дошкольный возраст, мимика, жесты, зрительный контакт.

*А.Ж.Калыкбаева[1], А.А. Дарменова[2]*
*[1]PhD докторы, Абай атындағы Қазақ Ұлттық педагогикалық университетінің арнайы педагогика кафедрасының аға оқытушысы, 050010, Қазақстан Республикасы, Алматы қ.*
*[2] Магистратураның 1 курс студенті, 7М01908 – Арнайы педагогика мамандығы, Абай атындағы Қазақ Ұлттық педагогикалық университеті, Алматы қ., Қазақстан Республикасы,*
*mmakhabbat@mail.ru*

## 3-5 ЖАС АРАЛЫҒЫНДАҒЫ АУТИЗМ СПЕКТРІНІҢ БҰЗЫЛЫСТАРЫ БАР БАЛАЛАРДАҢЫ ВЕРБАЛСЫЗ КОММУНИКАЦИЯНЫ ҚАЛЫПТАСТЫРУ МӘСЕЛЕСІНІҢ ТЕОРИЯЛЫҚ ТАЛДАУЫ

*Аңдатпа*

Бұл мақалада аутизм спектрінің бұзылыстары (АСБ) бар 3–5 жас аралығындағы балалардың вербальсыз коммуникациясын қалыптастырудың теориялық негіздері жан-жақты қарастырылады. Ерте жастағы балалардың әлеуметтік қарым-қатынас дағдыларын дамытуда шешуші рөл атқаратын негізгі вербальсыз құралдар – көзбен байланыс пен көрсеткіш ишараның маңыздылығы ғылыми әдебиеттер мен эмпирикалық зерттеулерге сүйене отырып сипатталады. Аталған мәселенің өзектілігі Қазақстан Республикасында АСБ диагнозы қойылған балалар санының жылдан жылға артуымен, сондай-ақ олардың арнайы білім беру мен түзету-педагогикалық қолдау жүйесіне толыққанды бейімделу мүмкіндігінің шектеулілігімен тығыз байланысты. Мақалада қолданбалы мінез-құлықты талдау (ҚМТ) әдістемесіне ерекше назар аударылады. Бұл тәсіл – ғылыми негізделген, құрылымдалған және тиімділігі дәлелденген интервенциялық әдіс ретінде баланың коммуникативтік дағдыларын мақсатты түрде дамытуға мүмкіндік береді. Авторлар отандық және шетелдік зерттеулерге сүйене отырып, вербальсыз коммуникацияның компоненттері баланың эмоцияларын білдіру, бірлескен зейінді қалыптастыру, қоршаған ортамен өзара әрекет жасау секілді процестерге оң әсер ететінін негіздейді. Сонымен қатар, зерттеуде ерте жастағы араласудың маңызы, сондай-ақ баланың қоғамға және білім беру кеңістігіне табысты бейімделуі үшін дер кезінде және жүйелі түрде ұсынылатын түзету көмегінің қажеттілігі дәйектеледі. Бұл зерттеу арнайы, инклюзивті және түзету педагогикасы салаларында қызмет атқаратын мамандар үшін құнды ғылыми-тәжірибелік материал болып табылады.

**Кілт сөздер:** аутизм спектрінің бұзылыстары, вербалсыз коммуникация, қолданбалы мінез-құлықты талдау, мектепке дейінгі жас, мимика, ымишара, көзбен байланыс.

**Introduction.** The development of nonverbal communication means in early childhood constitutes a key condition for the formation of social competence, emotional regulation, and subsequent speech functioning. This task is particularly relevant for children with Autism Spectrum Disorder (ASD), as this population demonstrates impairments in fundamental communication mechanisms. These deficits

are primarily manifested in reduced eye contact, insufficient use of pointing gestures, limited emotional reciprocity, and difficulties in establishing joint attention. Such impairments hinder the child's full interaction with others and significantly complicate their integration into educational and sociocultural environments.

The relevance of studying the formation of nonverbal communication in children with ASD is justified by both practical and theoretical considerations. On the one hand, recent decades have witnessed a consistent increase in the number of diagnosed cases of autism. According to the World Health Organization (WHO), ASD is diagnosed in approximately 1 in 100 children globally, while many countries, including Kazakhstan, still face a lack of specialized methodologies aimed at early intervention (WHO, 2023, p. 4). On the other hand, despite significant progress in neuropsychology and special education, the current scientific literature reveals methodological gaps in understanding the mechanisms underlying nonverbal communication development as an independent and formative component within the structure of autistic development.

The very definition of "nonverbal communication" varies across conceptual frameworks. In the Russian psychological and pedagogical tradition, nonverbal communication is defined as a set of tools that mediate the transmission and perception of information in communication without the use of speech, including facial expressions, gestures, pantomime, spatial behavior, and prosodic features (Semenovich, 2020, p. 73). In contrast, the international literature emphasizes both the functional and interactive dimensions of nonverbal behavior. According to Knapp, Hall, and Horgan (2018, p. 19), nonverbal communication constitutes an autonomous semiotic system that facilitates the expression of emotions, regulation of interaction, and confirmation of meanings conveyed through verbal language.

Among the most significant nonverbal forms in early childhood are eye contact and pointing gestures, as these serve as the foundation for initiating dialogue and building the prerequisites for verbal communication. Impairments in establishing eye contact and a lack of pointing gestures are considered early markers of ASD, distinguishing affected children from their typically developing peers (Mundy et al., 2003, pp. 242–243). While neurotypical children by the age of 9–12 months demonstrate the ability to sustain mutual gaze in response to social engagement and use pointing gestures to draw adult attention to objects, children with autism generally do not exhibit such forms or do so in a limited and non-functional manner. These characteristics hinder the development of joint attention, which, as shown in studies by Tomasello (2008), is a critical mechanism for acquiring language and social norms.

Several major theoretical approaches to the study of nonverbal communication in children with ASD can be identified in the scientific literature. In Russian research, neuropsychological and cognitive-activity paradigms dominate. These perspectives consider nonverbal behavior in the context of emotional responsiveness, regulation, and motor planning (Lebedinskaya, 2017; Galperin, 2018). However, these approaches do not always incorporate behaviorally verifiable methodologies, thereby limiting their practical application in designing correctional interventions. In contrast, international research is largely based on the behaviorist paradigm, particularly the model of Applied Behavior Analysis (ABA), which involves systematic teaching and positive reinforcement of target communicative responses (Schreibman et al., 2015; Vollmer et al., 2019). This approach has demonstrated effectiveness in teaching children with ASD fundamental social skills, including establishing eye contact, using gestures, imitation, and initiating interactions.

Despite the robust evidence supporting the effectiveness of the ABA approach, its application in Russian-speaking pedagogical contexts remains fragmented. Nonverbal communication is still often treated as a secondary or auxiliary component in speech development training. This situation necessitates a methodological reevaluation and a renewed emphasis on the development of functional nonverbal communication as an independent and equally important domain of intervention.

The present study aims to address this theoretical-methodological gap by providing a theoretical rationale and practical evaluation of the effectiveness of ABA-based methods in forming eye contact and pointing gestures in children aged 3 to 5 years with ASD. The object of this study is the nonverbal communication of children with ASD, while its subject is the specific features of the development of key nonverbal components under structured ABA programs. The primary hypothesis of the research is

that systematic use of ABA techniques can effectively promote the formation of functional nonverbal communicative behaviors in children with autism, contributing to improved social initiative, engagement, and adaptation.

This goal is elaborated through the following research objectives:

1. To conduct a comparative theoretical analysis of approaches to the study of nonverbal communication in domestic and international literature;

2. To define the structural components of eye contact and pointing gestures as functional units of communication;

3. To describe the conditions and methods of applying the ABA approach in training children with ASD;

4. To empirically evaluate the effectiveness of the proposed intervention model.

Thus, the significance of this research lies both in its scientific novelty—through the integration of behavioral and communicative approaches—and in its practical relevance, as its outcomes may serve as a foundation for developing individualized correctional training programs aimed at early intervention for children with autism.

**Materials and Methods.** Considering nonverbal communication as a fundamental mechanism of social regulation, it is essential to account for the considerable difficulties experienced by children with Autism Spectrum Disorder (ASD) in its development. Given the young age of the target population (3–5 years), priority in corrective and pedagogical efforts is given to fostering the most basic forms of nonverbal expression—namely, eye contact and pointing gestures—as early and crucial indicators of a child's engagement in communication.

This developmental stage is considered critical for the emergence of joint attention mechanisms, motivation for social interaction, and the formation of prelinguistic communicative behaviors. At this point, children are developmentally capable of acquiring and using nonverbal communicative forms that serve as the foundation for later speech and cognitive development.

The primary aim of the present research is to provide a theoretical justification for the possibility of developing nonverbal communicative skills in children with ASD through the application of Applied Behavior Analysis (ABA). This aim determines the structure of the scientific inquiry, which encompasses the examination of mechanisms and conditions for the development of eye contact and pointing gestures within a behavioral framework, their functional relevance, pedagogical interpretation, and methodological basis for implementation.

The central hypothesis of this research is that pointing gestures and eye contact in children with ASD can be intentionally developed through consistent and systematic instruction using ABA methods. These methods include modeling, reinforcement, shaping, and generalization in naturalistic settings. Such communicative acts are not considered innate in the context of clinically significant autism but are instead viewed as learnable behaviors that can be cultivated through structured pedagogical intervention.

The scientific analysis revolves around several key research questions:

– What are the specific features of the development of pointing gestures and eye contact as elements of nonverbal communication in preschool-aged children with ASD?

– What are the main theoretical grounds for applying ABA methods to support nonverbal interaction in children with impaired communicative initiative?

– What stages and conditions are necessary for implementing a program for nonverbal behavior formation under pedagogical guidance?

– Which elements of theoretical models confirm the effectiveness of this approach, and how does it compare to other corrective and developmental methods?

To conduct the theoretical analysis, three core areas were identified:

1. The interpretation of eye contact and pointing gestures as components of functional nonverbal communication;

2. The description of educational conditions under which these components can be developed in children with ASD;

3. The systematization of behavioral methods aimed at the step-by-step development of these forms of interaction following the ABA logic.

The primary research method employed is theoretical and analytical, encompassing the review and interpretation of academic literature on nonverbal communication, ASD, developmental and special education, psycholinguistics, and behavioral therapy. Supplementary methods include logical modeling, comparative analysis, systematization, and deductive generalization. These methods help to construct a coherent picture of nonverbal behavior development in children with ASD within the chosen theoretical paradigm.

The description of the research material in the theoretical model refers to preschool-aged children (3–5 years) formally diagnosed with ASD and exhibiting pronounced deficits in nonverbal communication. Qualitatively, this group is characterized by limited initiation of social interaction, unstable or absent eye contact, and a lack of pointing gestures necessary for shared attention. Quantitatively, up to 80% of children with ASD under the age of five are estimated to be at risk in this area (Lord et al., 2022, p. 47), highlighting the urgent need for effective pedagogical strategies at this developmental stage.

The pointing gesture is conceptualized as one of the earliest manifestations of communicative initiative, reflecting a child's ability to direct another person's attention. It serves three main functions: initiating interaction, expressing requests, and sharing emotional experience (Tomasello, 2008, pp. 120–125). Eye contact, meanwhile, is essential for recognizing intentions, regulating emotional states, and coordinating actions with a communication partner (Mundy et al., 2003, pp. 241–245). In ASD, both mechanisms are typically disrupted due to neuropsychological development differences and diminished social motivation.

The development of these components within the ABA framework is carried out in stages using the following methods:

– Modeling: the adult demonstrates the target behavior for the child to imitate;

– Positive reinforcement: desired behaviors are followed by rewarding stimuli;

– Shaping: gradual formation of the target behavior through reinforcement of successive approximations;

– Prompting: verbal and physical cues provided to assist performance;

– Fading: gradual removal of prompts to encourage independent performance;

– Generalization: transfer of skills across different contexts and settings.

Each behavioral intervention is based on individual deficit analysis, monitoring progress, and adjusting goals as needed. For example, training in eye contact begins with short gaze fixation in response to a motivational object and progresses to sustained gaze during social interactions (Schreibman et al., 2015, p. 63). The pointing gesture is developed from imitation of the adult's action to spontaneous pointing intended to draw attention to an object. Both responses require repeated practice and transfer into natural settings such as play, everyday routines, and communication with caregivers.

From a methodological standpoint, it is essential not only to assess behavioral outcomes but also to consider the prerequisites for successful skill acquisition: the child's motivation, emotional involvement, resistance to distraction, and willingness to repeat behaviors. Given the challenges with self-regulation in children with ASD, ABA methods enable the creation of controlled environments and stable behavioral patterns that can be integrated into daily life.

The effectiveness of ABA techniques has been demonstrated in both short-term and long-term interventions (Bearss et al., 2020, p. 752). Particularly critical is the early onset of such interventions during the sensitive period of foundational communication skill development.

Thus, the theoretical model of nonverbal behavior development based on the ABA approach represents a coherent and structured system aimed at fostering pointing gestures and eye contact as teachable, functionally meaningful communication forms in children with ASD. It combines methodological rigor with flexibility for individual needs and offers practical applicability within educational settings.

**Results and Discussion**. The conducted theoretical analysis revealed that nonverbal communication, as a fundamental form of social interaction, develops in children at the earliest stages of ontogenesis and

precedes the acquisition of verbal language. Among its core components, pointing gestures and eye contact are the most essential, serving as a foundation for the establishment of primary dialogue between the child and the adult. In children with Autism Spectrum Disorder (ASD), however, these forms of communication are frequently impaired or entirely absent in natural development. This deficit significantly limits the emergence of effective communicative behavior and adversely affects overall cognitive and emotional development.

In the scientific literature, the pointing gesture is regarded as a critical tool for establishing joint attention and serves as a precursor to the symbolic and social functions of language (Tomasello, 2000; Carpenter, Nagell, & Tomasello, 1998). The absence or insufficient development of this gesture in children with ASD is associated with difficulties in establishing intentional communication and reduced intersubjectivity (Baron-Cohen, 1995; Mundy, 2016). Eye contact, in turn, facilitates the exchange of social signals and is widely recognized as one of the earliest indicators of autistic behavior. Its disruption is often interpreted as a sign of impaired social orientation and diminished capacity for shared emotional experiences.

A comparative review of domestic and international approaches revealed substantial differences in both the interpretation and practical strategies for developing nonverbal behavior in children with ASD. Russian studies (Semenovich, 2020; Lebedinskaya, 2018; Pevzner, 2019) primarily emphasize the psychophysiological and neuropsychological underpinnings of the disorder. These approaches focus on restoring functional neural connections, employing sensorimotor techniques, and enhancing emotional responsiveness. However, such approaches often lack quantifiable behavioral outcome measures and are not systematically integrated into behaviorally based interventions.

Conversely, international literature (Cooper, Heron, & Heward, 2020; Schreibman et al., 2015) predominantly adheres to behavioral and functional models. These models focus on the operant nature of behavior, analysis of antecedents and consequences, and the formation of adaptive skills through structured reinforcement. Applied Behavior Analysis (ABA) is presented as a methodologically robust and empirically validated intervention framework, especially effective in fostering communication skills.

An analysis of core ABA procedures confirms their applicability in developing pointing gestures and eye contact. Techniques such as shaping, prompting, fading, positive reinforcement, and functional behavior assessment allow for the structured acquisition of new communicative responses and the gradual establishment of stable, functional interaction. Empirical studies (Kasari et al., 2010; MacDonald et al., 2006) demonstrate that teaching pointing gestures within ABA-based programs promotes not only social initiative but also contributes to the emergence of verbal communication.

Of particular importance is the functional interpretation of the pointing gesture within the ABA framework. It is not viewed as a reflexive or merely imitative act but as a goal-directed behavior intended to achieve a specific outcome—whether gaining access to an object, attracting adult attention, or initiating further interaction. This perspective emphasizes the motivational basis of behavior and allows instruction to be tailored to the child's current needs and preferences.

Similarly, eye contact is conceptualized in ABA as a learned behavior that can be systematically shaped. Teaching eye contact involves promoting spontaneous gaze initiation in natural contexts and systematically reinforcing child-initiated eye contact. Studies have shown that even children with severe ASD symptoms can learn to establish and maintain eye contact through early behavioral intervention programs (Lovaas, 1987; Koegel et al., 2014).

Nevertheless, the scientific literature also notes certain limitations of the ABA approach. Some researchers highlight potential shortcomings related to the high degree of structure in ABA programs, the potential lack of flexibility, and the need for intensive professional training, all of which may impede the widespread implementation of ABA strategies in general early childhood education settings (Gernsbacher, 2006; Green, 1996). However, despite these concerns, the effectiveness of ABA in developing foundational communication forms in children with ASD is widely acknowledged by leading institutions, including the U.S. National Autism Center (2015).

The analysis of theoretical and practical dimensions of pointing gesture and eye contact development within the ABA framework supports the conclusion that the behavioral approach offers several distinct advantages: goal precision, individualized interventions, empirical validation, and objective progress assessment. These attributes make ABA applicable not only in specialized therapy settings but also in inclusive educational environments, provided that techniques are adapted to the cultural and pedagogical context.

Based on the findings, it can be concluded that the issue of nonverbal communication development in preschool-aged children with ASD remains highly relevant and insufficiently explored within Russian scientific discourse. Particular emphasis should be placed on the development of elementary gestures and eye contact as primary forms of socially initiated interaction. The justification for applying ABA both as a theoretical model and as a practical approach is grounded in its robust evidence base, adaptability, and focus on functional outcomes. The theoretical results obtained through this analysis may serve as a foundation for designing future intervention programs aimed at cultivating functional communication skills in children with ASD within early childhood education settings.

**Conclusion.** The theoretical analysis of the literature concerning the development of nonverbal communication in children aged 3 to 5 years with Autism Spectrum Disorder (ASD) has revealed a number of key aspects of both scientific and practical relevance. One of the central findings is the recognition that nonverbal forms of interaction—particularly eye contact and pointing gestures—play a crucial role in the socialization of children. Their deficit in children with autism is directly linked to difficulties in establishing meaningful interactions with others. This highlights the importance of targeted efforts to foster these forms of communication within specialized intervention programs.

The main conclusion of this study is that pointing gestures and eye contact are not spontaneously developing behavioral components in children with ASD. Unlike neurotypical peers who utilize such gestures from an early age to attract attention or convey meaning, children with autism often fail to initiate or sustain these nonverbal behaviors. This presents a challenge for professionals, who must develop and implement effective strategies to promote the emergence of these behaviors as essential elements of functional nonverbal communication.

In this context, approaches such as Applied Behavior Analysis (ABA) assume particular importance. ABA provides evidence-based methods for supporting children with ASD, particularly in developing functional communication. Techniques such as positive reinforcement, behavior modeling, and functional behavior assessment allow for precise diagnosis and the creation of structured development programs tailored to the communicative needs of each child. These strategies have a robust empirical foundation and have been shown to produce stable, long-term behavioral change, which is critical in working with children on the autism spectrum.

A key strength of the ABA approach lies in its focus on the individual characteristics of each child, which makes it especially suitable for application in ASD cases, where perceptual and behavioral responses to environmental stimuli vary widely. Nevertheless, the literature review also identifies several gaps in current research. Despite increasing interest in nonverbal communication in children with ASD—particularly regarding pointing gestures and eye contact—most publications continue to focus on verbal skills or other behavioral aspects. Within Russian academic discourse, the formation of functional nonverbal forms of interaction such as gestures, facial expressions, and gaze remains underexplored, despite their importance in the early stages of social development.

This underscores the necessity for continued research and methodological refinement focused specifically on early childhood. Additionally, several international studies indicate a trend toward the use of comprehensive intervention programs that integrate ABA techniques with sensory integration strategies, which may enhance communication outcomes for children with ASD. Comparative analysis of various approaches shows that the most effective interventions combine ABA practices with methods designed to support the child's social interaction and emotional intelligence.

The objective of this study was to explore and systematize existing approaches to teaching children with ASD to use nonverbal communication and, based on theoretical analysis, to identify the most

effective strategies. Various theoretical models were reviewed, with their respective strengths and limitations examined. ABA demonstrated particularly high effectiveness in teaching eye contact and pointing gestures. However, achieving optimal results requires a comprehensive intervention model that incorporates additional corrective methods.

Another key insight from this research is the vital importance of early intervention for children with ASD. The earlier the educational efforts begin, the greater the likelihood that the child will develop communication skills essential for successful social integration. It is therefore imperative that professionals working with children on the autism spectrum possess a deep understanding of the unique features of nonverbal communication in this population and design programs that align with the needs of each individual child.

In conclusion, further research into the development of nonverbal communication in children with ASD holds significant potential for advancing new methods and practices in the field. The practical application of the results obtained in this study may meaningfully enhance the quality of life of children with autism and accelerate their social integration. Consequently, it is necessary to continue developing both theoretical frameworks and practical recommendations aimed at improving nonverbal communication in this population—guided by the latest scientific evidence and methodologies, and with a focus on equipping educators and specialists with effective tools for their work.

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